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INSTRUCTION MANUAL FOR  
280 VS METAL TURNING LATHE

## INSTALLATION

### Cleaning

Before wiring the machine to the mains supply, first remove all anti-corrosive coatings from the slideways, leadscrew, feedshaft and all bright surfaces using a kerosene based cleaner. After cleaning, oil all bright and machined surfaces with a light machine oil.

## LIFTING

### Bench Model (without tray or cabinet)

Fix lifting eye bolt to underside of slideway at the headstock end, move the tailstock to the opposite end of bed and lock. Move saddle assembly up to tailstock and lock to counter balance. With rope sling through the eye bolt - the machine can then be lifted - See Fig. 1.

### Cabinet Model

Remove chip guard and rear splash guard. Place lifting rope around each end of the cabinet - See Fig. 2.

Fork Lift - To lift the cabinet model using a Fork Lift, place the forks in the slot above the centre panel.

If Skates are used, support only on the bolting down bosses.

## ERCTION ON SITE

The machine must be situated in such a place as to allow free access for operating and maintenance (see layout diagram).

### Bench Model (without tray or cabinet)

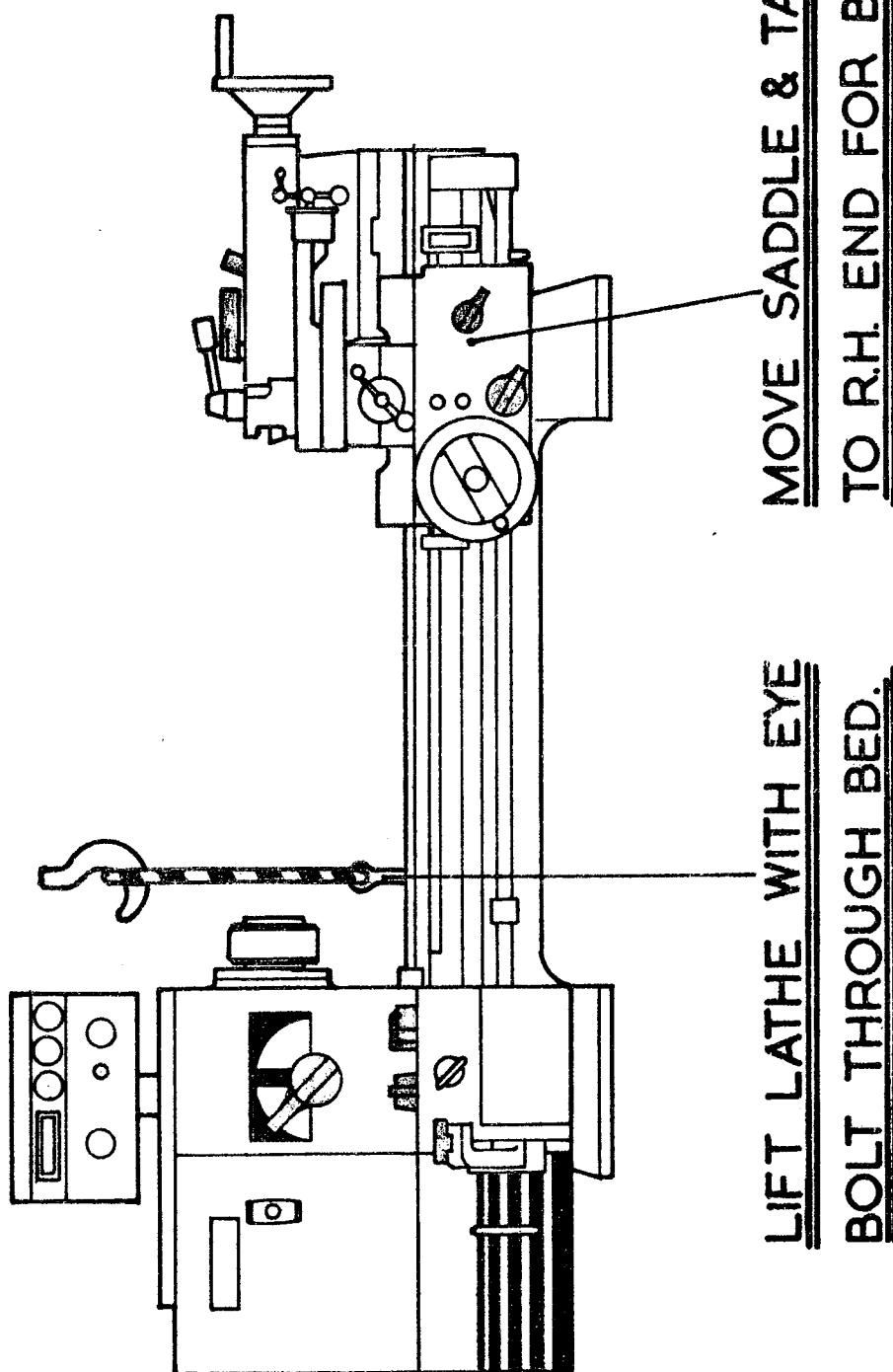
The machine should be bolted down on a rigid level bench. Care must be taken not to over-tighten the bolts and distort lathe bed. After installation the machine must be accurately levelled with a precision level at the headstock and the tailstock ends of the machine bed.

### Cabinet Model

The machine can be free standing on a level solid surface. If the machine is bolted down care must be taken not to over-tighten the foundation bolts. The same levelling procedure must be undertaken as described for the bench model.

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**FIG I.**

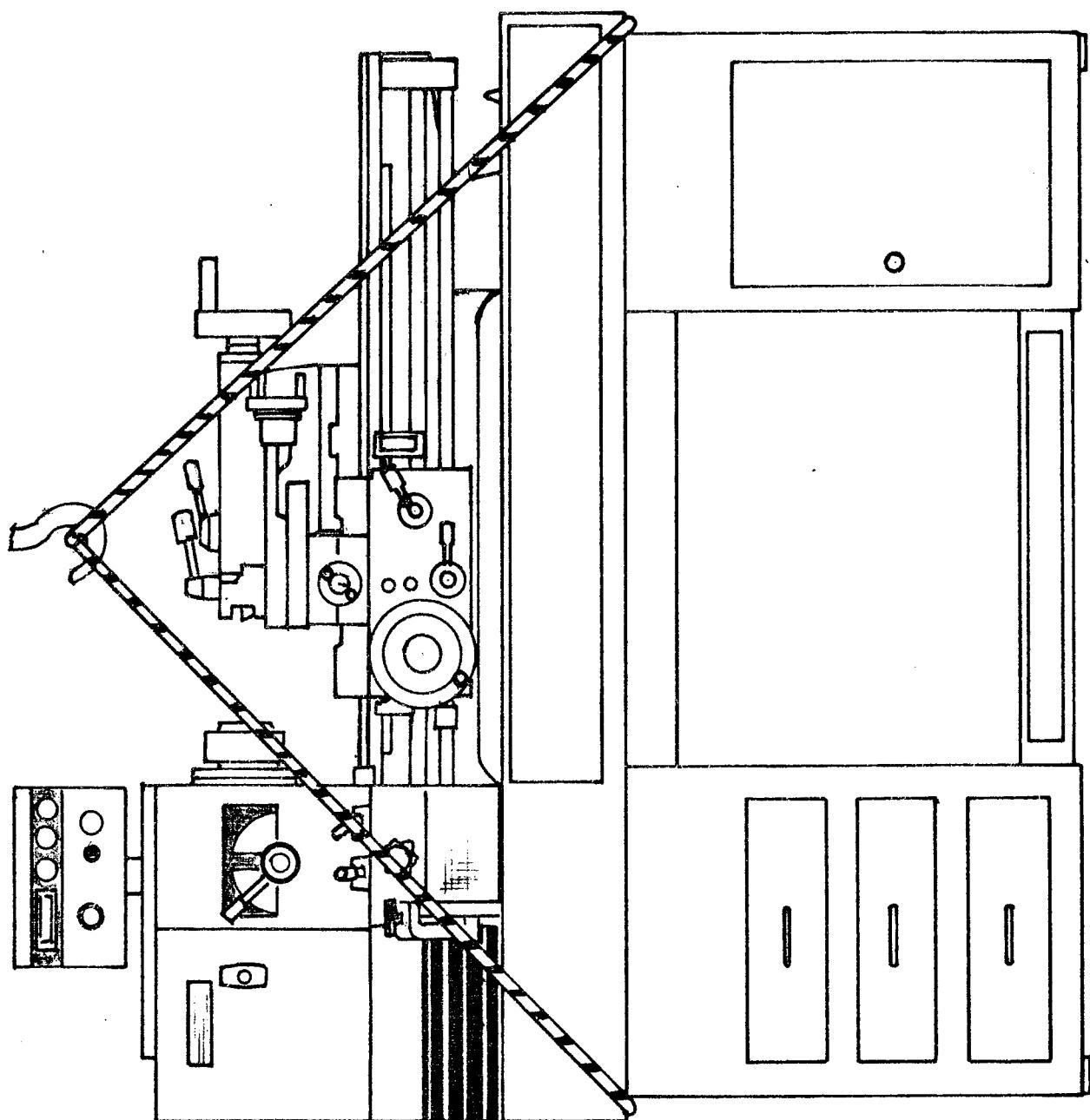


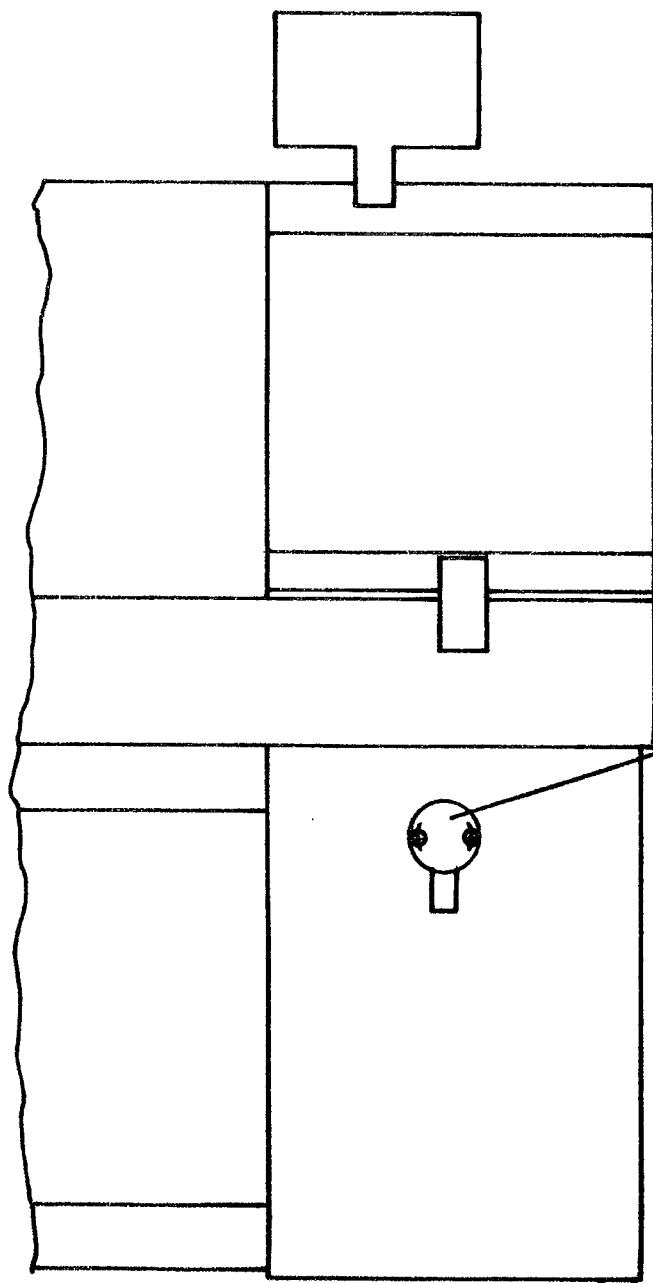
FIG 2

## ELECTRICAL SUPPLY CONNECTION

Three phase connection with earth.

Remove cover at the back of the machine (Head end). Four wires lead to the junction box ( three phases and earth (green) .The machine should only be wired by a suitably qualified electrician.

\*\* Ensure correct direction of rotation to coincide with forward and reversing switch on panel.



REMOVE JUNCTION BOX  
COVER & CONNECT FOUR  
WIRES TO MAINS SUPPLY.

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### LUBRICATION CHECKS

All oiling and greasing points have been fitted prior to despatch. Before operation of the machine, check the oilsite levels in the headstock gearbox and the apron and fill to correct levels. All slideways should be lightly oiled before movement of the saddle and tailstock. Ensure endrive is lubricated and free to move. For frequency of lubrication and correct grade oils, refer to the chart - Fig.3

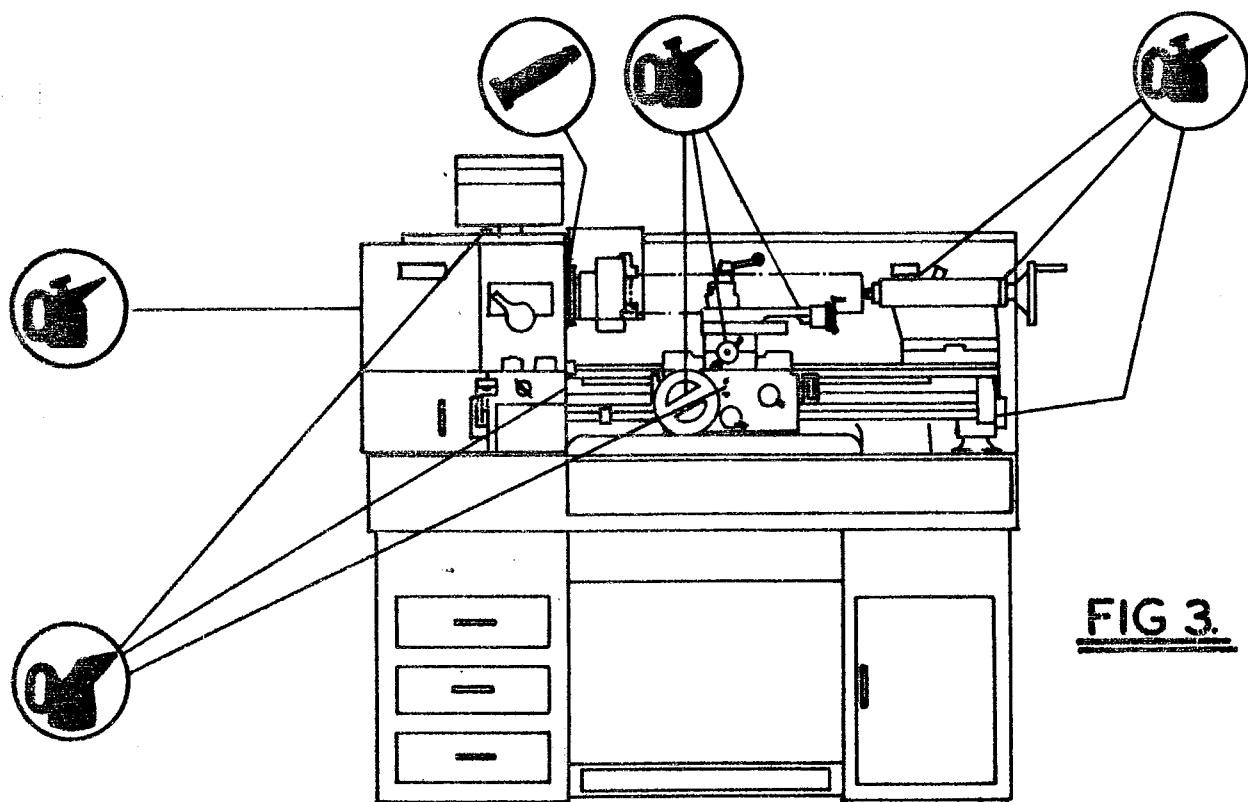


FIG 3.

<u>LUBRICATION</u>		
	<u>SHELL</u>	<u>CASTROL</u>
	VITREA 68	PERFECTO NN
	VITREA 68	PERFECTO NN
	ALVANIA N° 3	SPHEEROL AP3

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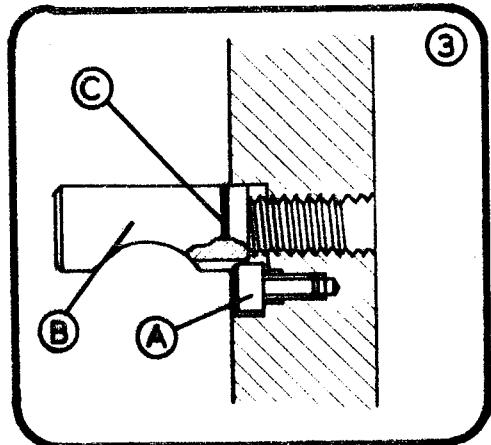
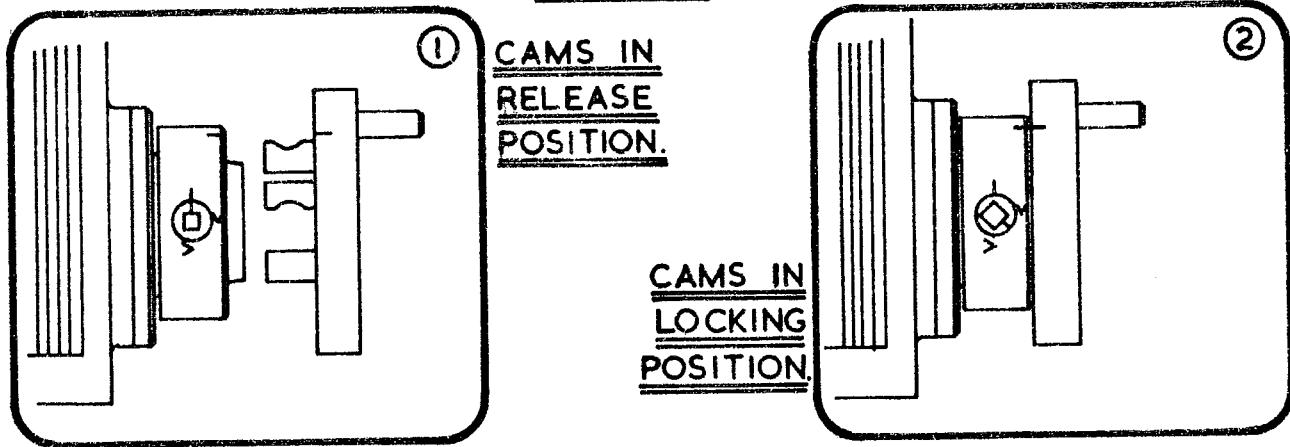
## CHUCK AND FACEPLATE MOUNTING

Before mounting chuck or faceplate first ensure that the spindle taper and the internal taper of the chuck or faceplate is clean and free from dirt or protective covering.

The line on the camlock cams in the spindle should be in line with the mark on the spindle o/d when the chuck is loaded to the spindle. Load the chuck and turn the cams with the key provided in a clockwise direction to tighten and lock the chuck to the spindle nose. The correct position of the cams in the lock position is shown in diagram 2 - Fig. 4.

It may be necessary on chucks supplied without the camlock studs fitted to adjust the studs so that the required cam action is obtained. This can best be set by screwing the studs to the bottom thread and then removing one complete turn. Adjustment for locking should then be carried out.

FIG 4.



### TO ADJUST 'CAMLOCK STUDS.'

REMOVE LOCKSCREW **(A)** TURN STUD **(B)** ONE FULL TURN, IN OR OUT AS REQUIRED.  
REPLACE LOCKSCREW AND TIGHTEN.

NOTE :- A DATUM RING **(C)** ON EACH STUD DENOTES THE ORIGINAL SETTING.

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## OPERATION.

Having carried out the necessary procedure for the installation of the machine it is now ready for operation.

Switch on the isolation switch, then the switch on the pendant panel to forward or reverse for spindle travel, then press the ON (green) button to start spindle. First run should be at a slow speed to ensure freedom of all running parts.

## SPEED SELECTION - OPERATION OF SPINDLE.

The spindle speeds are divided into high and low range, selection is made by removing the lever on the headstock face (Fig. 6 (B)) to HIGH or LOW range. Speeds within the selected range are obtained by removing the joystick on the pendant panel directly below the digital readout. Move the joystick to the right to increase speed or to the left to decrease the speed. Speeds can be changed whilst the spindle is in motion within the selected range. STOP THE SPINDLE to change to HIGH or LOW range moving the spindle by hand until engagement is made. To stop the machine press the Mushroom stop button on the pendant panel. To rotate the spindle by hand move the lever on the headstock face to the intermediate vertical position.

A speed lock is incorporated in the pendant for locking in any desired speed.

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OPERATE LEVERS  
OPERATE LEVERS

C,D,E & F WHEN MACHINE IS IN MOTION.  
A,B & G WITH MACHINE STOPPED.

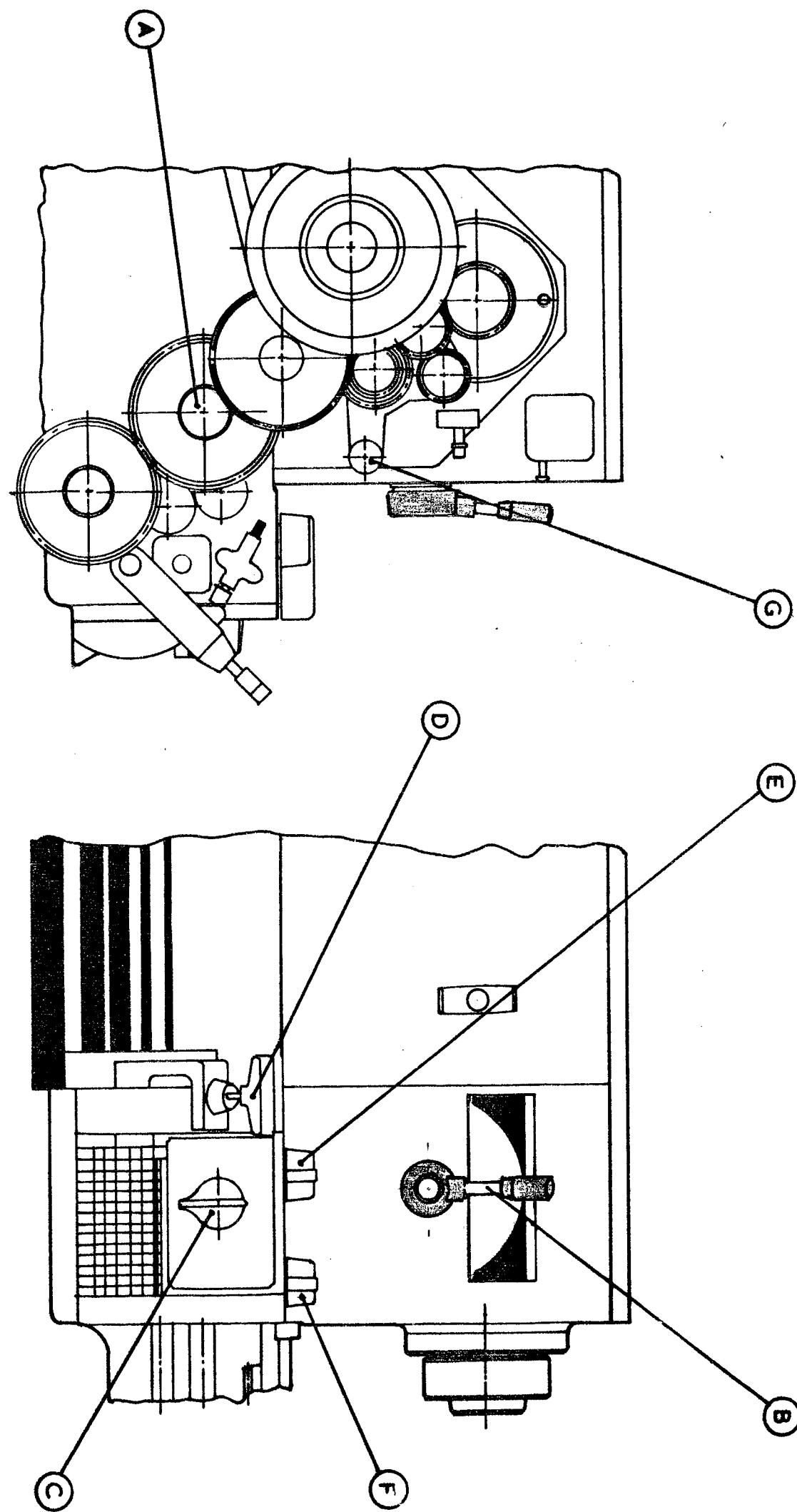


FIG 6.

## THREAD AND FEED SELECTION

The 280VS machine is fitted with a universal gearbox. All threads and feeds directly available are displayed on the front of the gearbox together with instructions for lever settings to obtain them. See Fig. 11 and 12.

e.g.

To select 20 T.P.I.

- 1). Select low range spindle speed required. Fig.6 (B)
- 2). With LATHE SWITCHED OFF, move quadrant sliding gear. Fig.6 (A) to IN position and close guard.
- 3). Start machine.
- 4). Move gear engagement lever to NEUTRAL position marked 'N' on gear engagement chart Fig. 6 (D)
- 5). Select No.3 on selector dial Fig.6 (C). DO NOT TRY TO MOVE selector dial (C) unless gear engagement lever (D) is in NEUTRAL position.
- 6). Move gear engagement lever (D) to No.3 to correspond to the number on selector dial (C) Fig.6
- 7). Move lever on top left of gearbox (E) to the right to select 20 T.P.I as indicated on chart when MACHINE IS RUNNING.
- 8). Move feedshaft/leadscrew selector lever (F) on top of gearbox to leadscrew position WHEN MACHINE IS RUNNING.

The lathe is now ready to cut 20 T.P.I.

NB. DO NOT FORCE LEVERS INTO ENGAGEMENT. ENSURE CORRECT SEQUENCE FOR SELECTION IS OBSERVED.

### CROSS AND TOP SLIDES

The tapped holes in the saddle wings of the 280VS Lathe facilitate the clamping of ancillary equipment e.g. travelling steady, coolant taps etc.

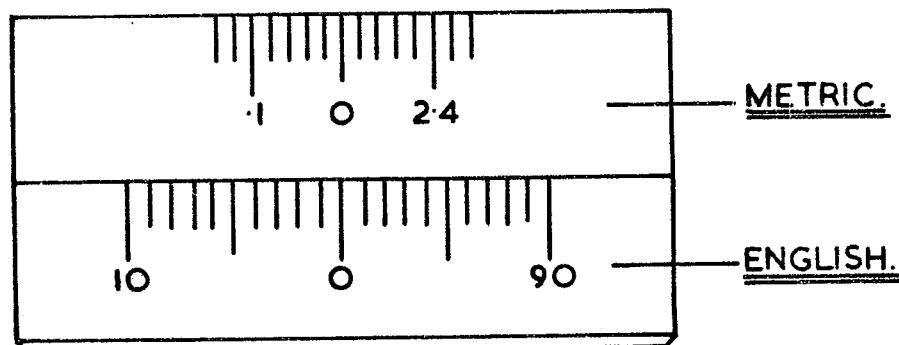
By removing the top slide a boring table may be fitted for boring and milling operations using the chuck as a toolholder.

The top slide can be swung to any angle for short taper turning operations by hand. There are three types of toolpost available- the two-way is standard to the 280VS lathe, a four-way and Quick Change toolpost (E) Fig.7 is also available for repetitive work.

The 280 VS Lathe is fitted with 'dual dials' to the top and cross slide screws to read imperial or metric. Details of graduations are given in Fig.13.

### TOPSLIDE & CROSSLIDE DIALS.

FIG 13.



METRIC 1 DIV = .02MM.



ENGLISH 1 DIV = .001"

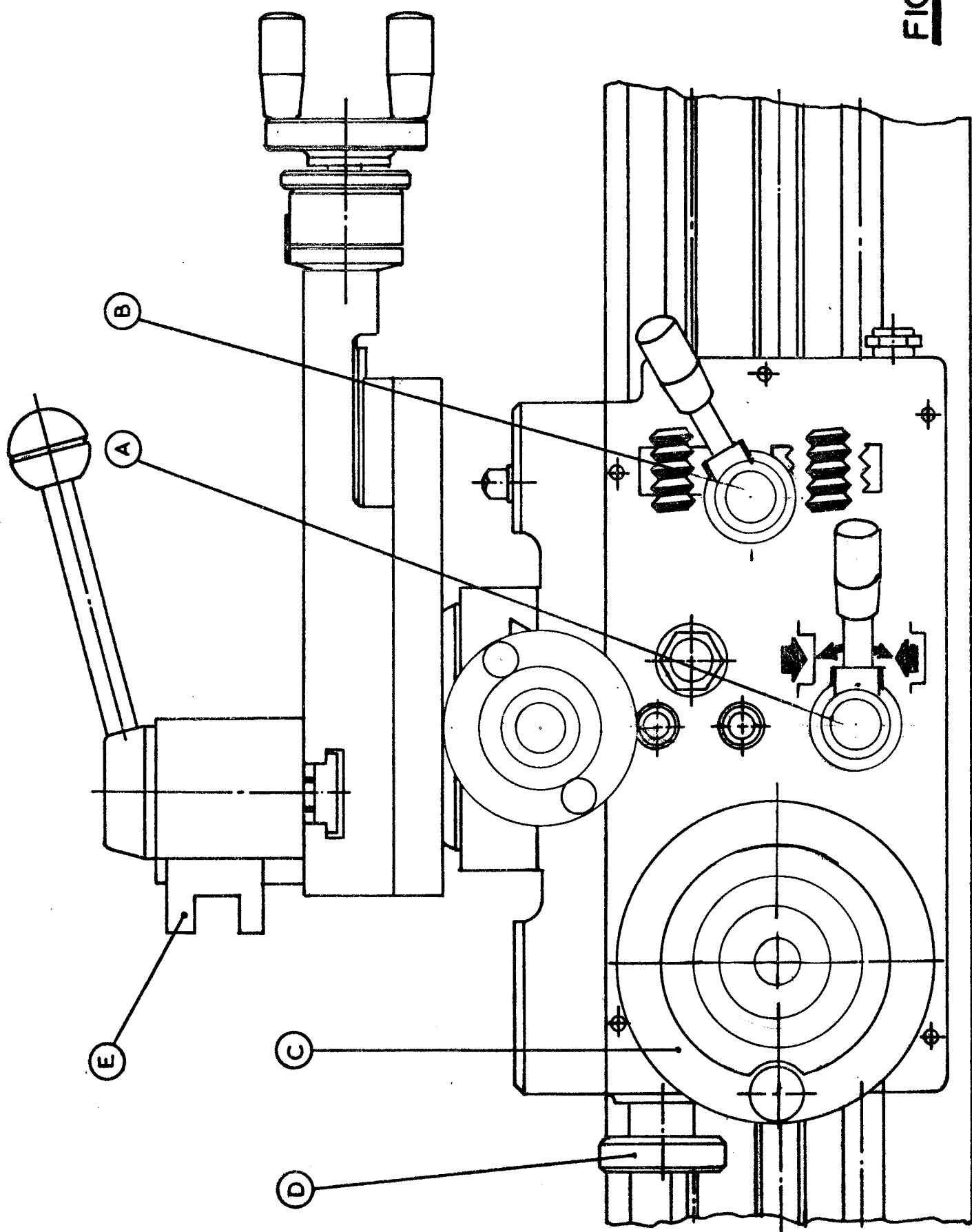


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FIG 7.



### OPERATION OF APRON FOR SLIDING AND SURFACING

Select feed from the chart on the gearbox and set the levers to the appropriate positions. The apron is then ready for engagement on the feedshaft. Clear the workpiece with the cutting tool and pull down the chip guard. Engage the feed by moving the lever (A) Fig. 7 in the centre of the apron. Move the lever up to traverse towards the chuck. To reverse the travel engage reversing bracket, (G). To stop the apron traversing move the lever to a horizontal position.

### SURFACING

To engage the crosslide traverse turn the knob on the chuck side of the apron (D) anti-clockwise to engage the traverse towards the centre of the chuck.

### SCREWCUTTING

All screwcutting feeds are obtainable through the 3mm pitch (metric) or 8 T.P.I. (imperial leadscrew.) The pitches available are displayed on the front of the gearbox Fig. 11 and 12.

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## IMPERIAL THREADS & FEEDS.

QUADRANT SLIDING GEAR		TOP LEVER				THREADS PER INCH				FEEDS IN THOUSANDTHS			
IN	LEFT	1	2	3	4	5	6	7	8	DIAL READING			
		4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7		T.P.I.		
		.0764	.0680	.0611	.0555	.0531	.0509	.0470	.0437		SLIDING		
		.0300	.0267	.0240	.0218	.0209	.0200	.0184	.0171		SURFACING		
		8	9	10	11	11 1/2	12	13	14		T.P.I.		
	CENTRE	.0382	.0340	.0306	.0279	.0266	.0254	.0235	.0218		SLIDING		
		.0150	.0134	.0120	.0109	.0104	.0100	.0092	.0086		SURFACING		
	RIGHT	16	18	20	22	23	24	26	28		T.P.I.		
		.0191	.0170	.0153	.0139	.0133	.0127	.0118	.0109		SLIDING		
		.0075	.0067	.0060	.0055	.0052	.0050	.0046	.0043		SURFACING		
OUT	LEFT	32	36	40	44	46	48	52	56		T.P.I.		
		.0096	.0085	.0076	.0070	.0066	.0064	.0059	.0054		SLIDING		
		.0038	.0034	.0030	.0027	.0026	.0025	.0023	.0021		SURFACING		
	CENTRE	64	72	80	88	92	96	104	112		T.P.I.		
		.0048	.0042	.0038	.0035	.0033	.0032	.0029	.0027		SLIDING		
		.0019	.0017	.0015	.0014	.0013	.0012	.0011	.0010		SURFACING		
	RIGHT	128	144	160	176	184	192	208	224		T.P.I.		
		.0024	.0021	.0019	.0018	.0017	.0016	.0015	.0014		SLIDING		
		.0009	.0008	.0008	.0007	.0007	.0006	.0006	.0005		SURFACING		

## FIG II.

## I.S.O. THREADS & FEEDS.

QUAD SLIDING GEAR	TOP LEVER	3 M/M L'SCREW PITCHES AND FEEDS IN M/M												STUD GEAR DIAL READING
		G	D	G	C	E	G	D	F	C	D	B	A	
		2	1	4	1	2	5	2	3	2	3	2	2	
IN	LEFT	7.0	6.0	—	5.5	—	5.0	—	4.5	—	4.0	—	—	
		2.140	1.833	1.712	1.680	1.589	1.528	1.467	1.375	1.345	1.222	1.100	.978	
		.840	.720	.672	.660	.624	.600	.576	.540	.528	.480	.432	.384	
	RIGHT	3.5	3.0	—	—	—	2.5	—	—	—	2.0	—	—	
		.70	.61	.56	.540	.594	.764	.723	.687	.672	.611	.550	.489	
		.420	.360	.336	.330	.312	.300	.288	.270	.264	.240	.216	.192	
OUT	LEFT	1.75	1.5	1.4	—	1.3	1.25	1.2	—	1.1	1.0	.90	.80	
		.535	.468	.428	.420	.397	.382	.366	.343	.336	.305	.275	.244	
		.210	.180	.168	.165	.156	.150	.144	.135	.132	.120	.108	.096	
	CENTRE	—	.75	.70	—	—	—	.60	—	—	.50	.45	.40	
		.268	.229	.214	.210	.198	.191	.183	.171	.168	.152	.138	.122	
		.105	.090	.084	.082	.078	.075	.072	.068	.066	.060	.054	.048	
	RIGHT	—	.375	.35	—	.325	—	.30	—	.275	.25	.225	.20	
		.134	.114	.107	.105	.099	.095	.091	.085	.084	.076	.069	.061	
		.052	.045	.042	.041	.039	.038	.036	.034	.033	.030	.027	.024	

**FIG 12.**

## TAILSTOCK

The tailstock is of solid cast iron construction mounted on a cast iron shoe for adjustment and the turning of shallow tapers.

The tailstock quill is self ejecting and is graduated for direct reading for drill depths etc. The quill has a BMT bore and may be locked in position by the locking handle as shown in Fig.5.

## LOCKING

The tailstock is locked to the bed by means of a bed clamp operated by lever (B) Fig.3. The quill is locked by moving lever (A) away from the headstock in a clockwise direction.

## ADJUSTMENT

The tailstock is set to turn parallel to the bed. Should any adjustment be required i.e. taper turning - adjustment is made by the two grub screws at the front and back of the tailstock. To adjust, loosen off one of the grub screws A and B and tighten the other until the desired taper is achieved.

Fig.5.

ND. Ensure that the two screws are tight before reclamping the tailstock to the bed. The amount of set over required for a given taper may be calculated as follows :-

$$\text{Set over required (mm).} = \frac{\text{Length (mm)} \times \text{taper (mm)}}{2}$$

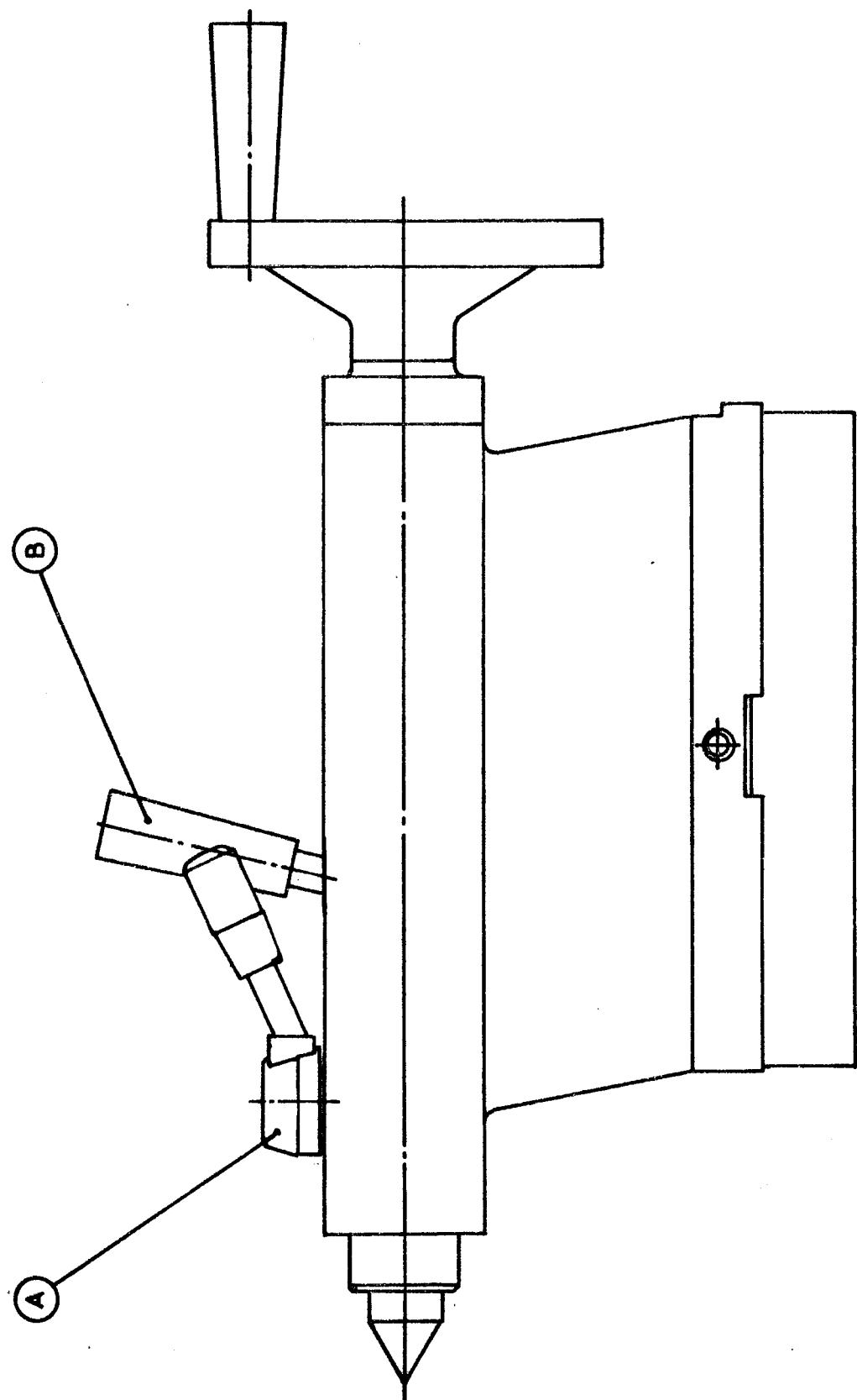
$$\text{Set over required (inches)} = \frac{\text{Taper per foot or dia.} \times \text{length (inches)}}{24}$$

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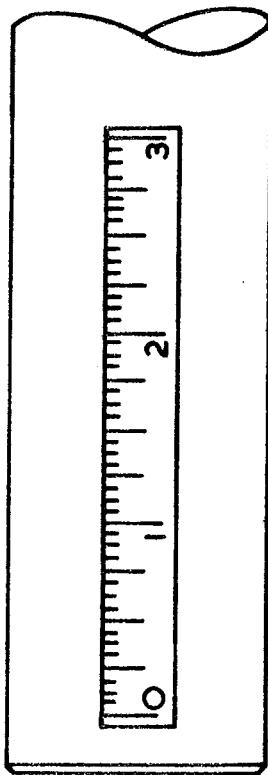
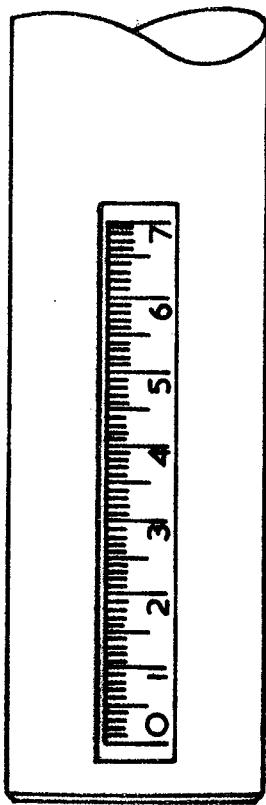
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FIG 8.



METRIC MM. ————— GRADUATIONS ————— ENGLISH INCHES.



ADJUST BY FACING HANDLE.

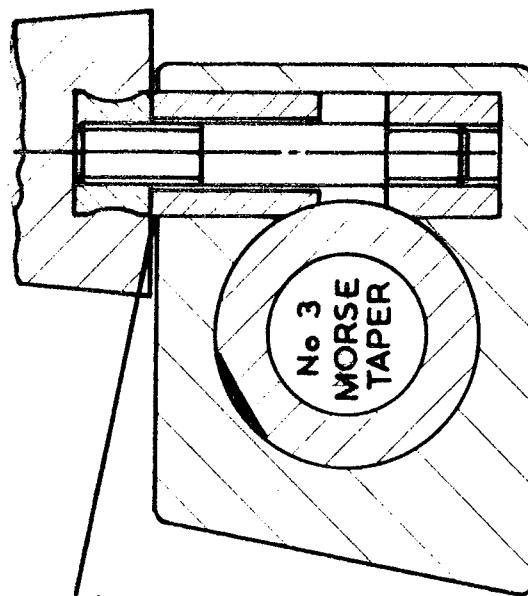
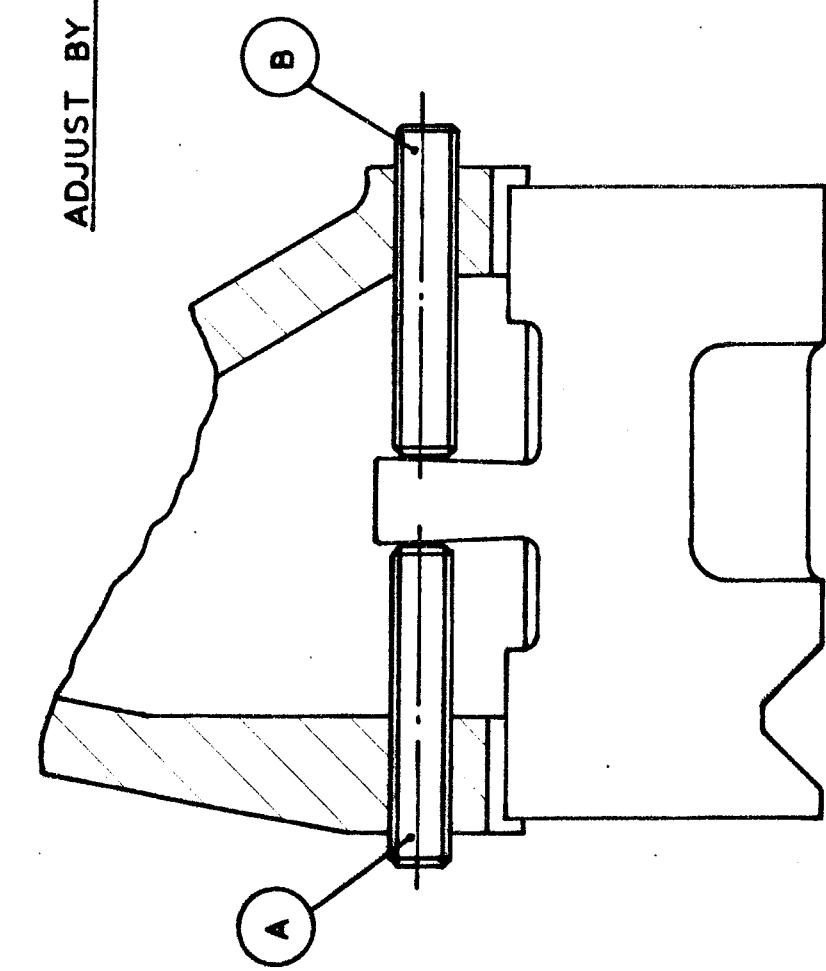


FIG 5

TAILSTOCK ADJUSTMENT.

## MAINTENANCE

Routine inspection and maintenance of the machine should be carried out to the following schedule :-

PERIOD	MAINTENANCE REQUIRED
Daily	Check level of oil in sight glasses Lubricate Oil Nipples Clean dials and graduations Wipe slides and ways, leaving a thin film of oil Check quantity of cutting fluid in reservoir Clean out swarf Lubricate end drive
Weekly	Clean machine thoroughly Check nuts and bolts for slackness
Six monthly	Drain apron, gearbox headstock, oil sumps and replenish with clean oil Check adjustment of saddle and side strips Clean out coolant reservoir, pipes and pump Grease headstock bearings.
Annually	Check machine alignments and accuracy Check headstock bearings adjustment Re grease motor bearings and inspect electrical equipment

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## MAINTENANCE

### Changewheel Shear Key

As a protection against accidental overload of the end train a shear key is fitted in the sleeve at the bottom of the quadrant train. In the event of a replacement being necessary a 3/16"sq. x 13/16"long GR1 aluminium key should be fitted. Remove the end plate by removing centre screw using 6mm allen key, pull off the gears and sleeve and remove the sheared key. Replace the key and re-assemble - see (END DRIVE ARRANGEMENT)

### TOP SLIDE - STRIP ADJUSTMENT

Take up for wear on the top slide jib strip is by means of 3 socket lead screws and lock nuts. To adjust loosen the 3 lock nuts, adjust screws to give slight drag, then tighten lock nuts - see Fig.9.

### CROSS SLIDE - STRIP ADJUSTMENT

As for Top Slide - see Fig. 9.

### SPINDLE END PLAY (adjustment)

The taper roller main bearings have been correctly adjusted and pre-loaded on assembly and should not require any attention provided the initial setting is not disturbed. To adjust the pre-load, slacken off the lock nut on the spindle (A) Fig.10 and adjust the pre-load by turning the transducer gear (B) in small increments. NOTE THE THREAD IS LEFT HAND After each tightening of the transducer gear (B) check that the pre-load is not excessive. The machine should run at top speed and the bearings should not exceed 65°C (150°F).

NOTE A certain amount of temperature rise must be expected when running the lathe at high speed but it should be possible to place the hand on the spindle nose after an hours running without discomfort. Check that the lock nut (A) is tight up against the transducer gear (B) after adjustment. The transducer re-set gap is 040".

### LEADScrew (adjustment)

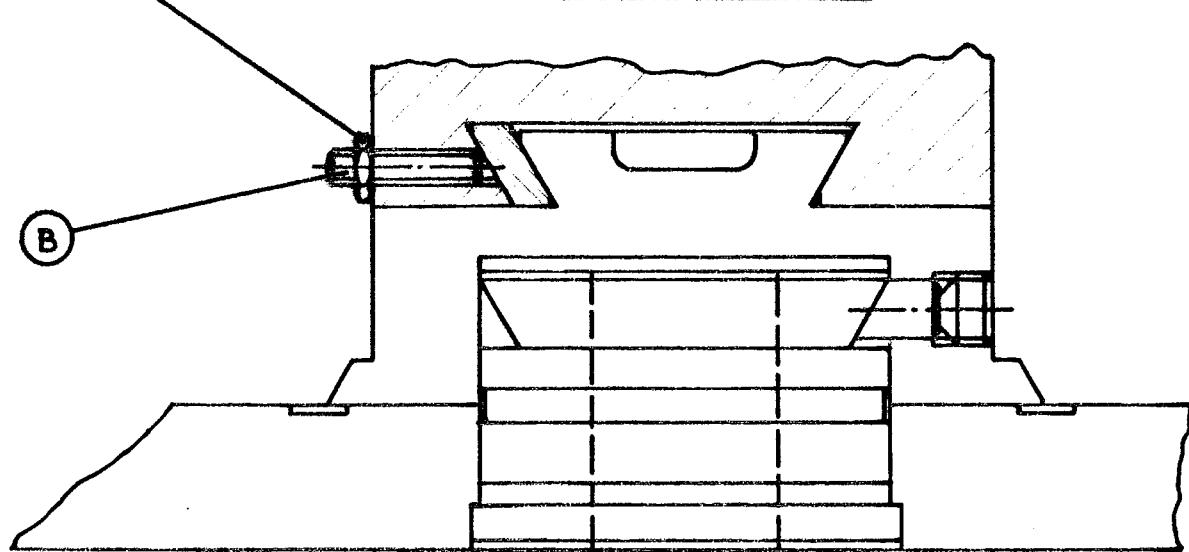
The end thrust of the leadscrew acts upon a pair of needle roller thrust washers at the tailstock end of the bed. To eliminate any end play, adjust the lock nuts at the end of the leadscrew.

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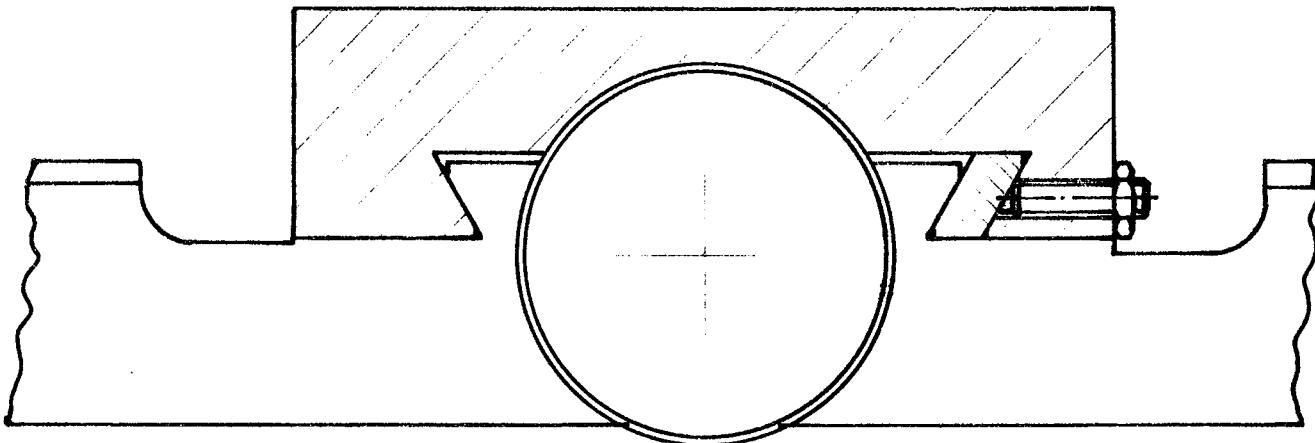
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## TOP SLIDE.



TO ADJUST STRIP FOR WEAR LOSEN NUTS, ADJUST  
SCREW B & TIGHTEN LOCKNUTS A.

## CROSS SLIDE.



ADJUST AS FOR TOP SLIDE.

FIG 9.

